

**Patent Abstracts of Japan**

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APPLICATION NUMBER : 60187831

APPLICANT : NITTO ELECTRIC IND CO LTD;

INVENTOR : IWAMA AKIO;

INT.CL. : B01D 13/04

TITLE : PRODUCTION OF AROMATIC POLYSULFONE HOLLOW YARN MEMBRANE

ABSTRACT : PURPOSE: To easily control the diameter of the fine pore on the outer surface by introducing a coagulating liq. into the inner tube, bringing the outer surface into contact with the vapor of a nonsolvent and then immersing the hollow yarn in water when the hollow yarn is spun from an aromatic polysulfone film forming soln.

CONSTITUTION: Aromatic polysulfone is dissolved in a mixed solvent of a polar org. solvent dissolving the polysulfone and a nonsolvent not dissolving the polysulfone. The amt. of the nonsolvent is regulated to 5~50wt% and the concn. of the polymer is controlled to 5~35wt%. When a hollow yarn is spun from the soln., a coagulating liq. such as water is passed through the inner tube of a double-tube nozzle. The membrane forming soln. is extruded from the nozzle and passed through the vapor of the nonsolvent for  $\geq 0.1$  sec. The pressure of the nonsolvent vapor is made higher by  $\geq 15$  mmHg than the vapor pressure at the temp. at which the membrane is formed. Water or alcohols are used as the nonsolvent. Consequently, the thickness of the reticular porous layer can be regulated to 20~50% of the total membrane thickness.

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**XP-002133961**

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**A - [001] 014 03- 05- 151 153 30& 316 32& 332 342 398 403 405 415 448 466**  
**470 481 491 493 51& 546 55& 56& 575 595 596 623 624**  
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**KS - 0016 0229 1309 2318 2444 2473 2475 2483 2486 2500 2507 2539 2653 2654**  
**3215 3245 3270**  
**MC - A05-J06 A11-B06D A11-B15C A12-S05A A12-W11A J01-C03**  
**PA - (NITL ) NITTO ELECTRIC IND CO**  
**PN - JP62049911 A 19870304 DW198715 008pp**  
**- JP6096104B B2 19941130 DW199501 B01D71/68 000pp**  
**PR - JP19850187831 19850826**  
**XA - C1987-043025**  
**XIC - B01D-013/04 ; B01D-069/08 ; B01D-071/68 ; D01D-005/24 ; D01D-005/247 ;**  
**D01F-006/76**  
**AB - J62049911 An aromatic polysulphone is dissolved in a mist. of polar**  
**organic solvent (which can dissolve the polysulphone) and a solvent**  
**(which is miscible with the first solvent but which cannot dissolve**  
**the polysulphone) to produce a membrane forming soln.**  
**- This soln. is then extruded from a double tube type nozzle (from its**  
**outer tube) and the outer surface is contacted with solvent vapor**  
**(having the vapour pressure higher than the vapour pressure at the**  
**temp of the membrane forming soln. by more than 15 mmHg). This is**  
**dipped in water and formed as hollow thread, at the same time, the**  
**solvent remaining in the hollow thread is removed. A dense surface**  
**having micro pores (10 - 100 angstrom) is formed on the inner surface**  
**and a dense surface having micro pores (0.01 - 0.5 microns) is formed**  
**on the outer surface.**  
**- A net-work shaped porous layer having small pores (the pore size is**  
**bigger than those in both surfaces, i.e. 0.05 - 5 microns and its**  
**thickness amounts to 20 50% of the total thickness of the membrane) is**  
**formed between two surfaces.**  
**IW - AROMATIC POLYSULPHONE HOLLOW THREAD MEMBRANE PRODUCE SOLVENT MIXTURE**  
**CONTAIN SOLVENT DISSOLVE POLYSULPHONE MISCIBLE SOLVENT**  
**IKW - AROMATIC POLYSULPHONE HOLLOW THREAD MEMBRANE PRODUCE SOLVENT MIXTURE**  
**CONTAIN SOLVENT DISSOLVE POLYSULPHONE MISCIBLE SOLVENT**  
**NC - 001**  
**OPD - 1985-08-26**  
**ORD - 1987-03-04**  
**PAW - (NITL ) NITTO ELECTRIC IND CO**  
**TI - Aromatic polysulphone hollow thread membrane prodn. - using solvent**  
**mixt. contg. solvent which dissolves polysulphone and miscible solvent**  
**which does not**

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STN CA Caesar accession number : 1304

AN - 106:215978 CA

TI - Manufacture of aromatic polysulfone hollow-fiber membranes

DT - Patent

IN - Ikehata, Hisashi; Ochiuni, Tsukasa; Nakao, Kazuro; Iwama, Akio

PA - Nitto Electric Industrial Co., Ltd., Japan

SO - Jpn. Kokai Tokkyo Koho, 8 pp.

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PATENT NO.

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PN	- JP62049911	A	19870304	JP 1985-187831	19850826 <--
	JP6096104	B	19941130		

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AB - Arom. polysulfone hollow-fiber membranes have a pore size distribution of 10-100  $\mu$ ANG. in the inner surface area, 0.01-0.5  $\mu$ m. in the outer surface area, and 0.05-5  $\mu$ m. in-between the surface areas. Such hollow-fiber membranes are manufd. by dissolving an arom. polysulfone in a mixt. of a polarized org. solvent (A) and a A-miscible but polysulfone-immiscible solvent, spinning the soln. out of a double nozzle into the polysulfone-immiscible solvent vapor (partial pressure 15 mmHg higher than that at the soln. temp.), and soaking into water to form a porous network. Thus, 17 wt. parts polysulfone (I) was dissolved in a mixt. of 58 wt. parts N-methyl-2-pyrrolidone and 25 wt. parts diethylene glycol, spun through a double nozzle into an atm. contg. steam vapor (partial pressure 25 mmHg higher than equil. pressure at 25.degree.) with an injection of water inside of the fiber hole, and hardened by soaking in water. The provided hollow fiber (inner diam. 0.5 mm, outer diam. 0.9 mm, thickness 200  $\mu$ m.) had a water permeability at 600 L/m<sup>2</sup>.h.atm., a sepn. efficiency against polyethylene glycol at 88%, and a rupture strength at 30 kg/cm<sup>2</sup>.